

How to place Order

Place your indents with BCRL one or two months in advance with the following particulars: 1. Name of the crop. 2. Total area of the crop. 3. Area desired to be treated with **Trichogramma**. 4. Name of the pest to be controlled. 5. Quantity of "Tricho Cards" required. 6. When supply desired. 7. Mode of supply desired. 8. Shipping address.

Advantages

- ◆ **Trichogramma** kills the pest in the egg stage itself, thus preventing potential damage to the crop by the caterpillars.
- ◆ The parasitoids themselves search the host and attack.
- ◆ The parasitoids multiply themselves while destroying the pest.
- ◆ No adverse effects on plants, environment or other beneficial organisms.
- ◆ **Trichogramma** is a purely beneficial insect.

PERIODICAL RELEASES OF **TRICHOGRAMMA** RESULT IN KILLING THE PESTS EVEN BEFORE THEY ARE BORN.

For more details and supply, please contact:

Bio-Control Research Laboratories.
A division of Pest Control (India) Ltd.,
P.O.Box 3228, R.T.Nagar, Bangalore-560 032

*In Pursuit of
Plant Protection
without Pollution!*

pci.....a pioneer



INDIA'S FIRST COMMERCIAL INSECTARY

Bio-Control Research Laboratories (BCRL), established at Bangalore in June 1981 by Pest Control (India) Ltd., is India's first ever commercial insectary.

Biological control agents - parasitoids, predators and pathogens - of certain major pests like sugarcane borers, scale insects, mealybugs, cotton bollworms, coconut black-headed caterpillar, housefly, etc. are mass produced and made available at BCRL with professional expertise.

Sex pheromones of cotton bollworms, codling moth etc. are also available.

Work on other pests and consultancy in pest management are also undertaken on specific requests.

**BIOLOGICAL CONTROL IS EFFECTIVE,
ECONOMICAL & ECOLOGICALLY SOUND**

TRICHOGRAMMA

THE TINY WASPS TO COMBAT MANY CATERPILLAR PESTS



No control...

COTTON BOLLWORMS

SUGARCANE BORERS

CODLING MOTH &

SEVERAL OTHER

CATERPILLAR PESTS



Bio-Control Research Laboratories

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TRICHOGRAMMA

THE TINY WASPS TO COMBAT MANY CATERPILLAR PESTS

About Trichogramma

The members of the genus *Trichogramma* (Hymenoptera, Trichogrammatidae) are minute insects - 8 to 10 adults can sit together on a pin head - known to attack the eggs of over 200 species of moths and butterflies. These beneficial parasitoids are produced in millions in several countries for biological control of a variety of crop pests. In India too, several species of *Trichogramma* are mass produced and supplied by Bio-Control Research Laboratories (BCRL) of Pest Control (India) Limited (PCI).

Target Pests

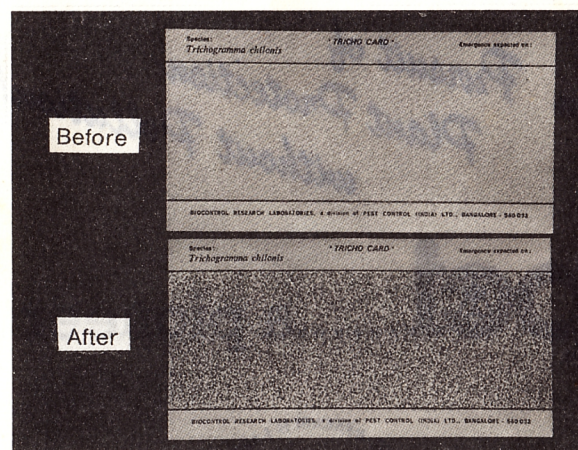
Sugarcane borers: Early shoot borer, internode borer and other tissue borers and sugarcane top-borer.

Cotton bollworms: *Helicoverpa armigera* (until recently called *Heliothis armigera*), Spotted bollworm, Spiny bollworm and Pink bollworm.

Codling moth and also several other caterpillar pests infesting tomato, sunflower and other crops.

How Pests are Killed

Trichogramma is an egg-parasitoid. There are several species. *T. chilonis* is used against sugarcane borers and cotton bollworms including *Helicoverpa armigera*; *T. japonicum* against sugarcane top-borer; *T. embryophagum* against codling moth, etc.



Eggs before and after parasitisation

The tiny adults search for host eggs in the fields and parasitise them i.e., they lay their own eggs within the eggs of the pest! On hatching, the parasitoid larva feeds on the embryonic contents of the egg and completes its development within. The parasitised eggs turn uniformly black in 3 to 4 days and adults emerge in 7 to 8 days. Thus, instead of a caterpillar, *Trichogramma* adult comes out of the host egg by chewing a circular hole in it. A single *Trichogramma*, while multiplying itself, can thus destroy over 100 eggs of the pest!

Mode of Supply



Supplied as parasitised host-eggs on "Tricho Card". "Tricho Cards" are safely packed in packets, indicating the date of emergence of adult parasitoids. Each host egg contains one or two *Trichogramma* adults. Such packets are supplied by Post Parcel/Speed Post/Air-freight/Courier Service etc. depending upon the convenience.

When to Release

Commence releasing as soon as the moths or their eggs are noticed in the fields. Release over the entire infested area and throughout the egg-laying period of the pest.

How to Release

Before emergence: Cut or tear each "Tricho Card" into small pieces and distribute them all over the field. The pieces may be stapled to the underside of the leaves or placed securely in the leaf-sheaths. Or they may be placed in small boxes fitted with fine wire mesh and tied to the plant. The parasitoids on emergence disperse in search of host eggs.



After emergence: Watch for emergence of tiny *Trichogramma* from the host eggs glued to the "Tricho Card". They generally emerge in the morning hours and should be released **as early as possible on the same day**. Hold the container open and slowly move in all directions in the field. The parasitoids, being winged, escape and get distributed.

Storage

To delay the emergence of adult *Trichogramma*, "Tricho Cards" can be stored in refrigerator at 5 to 10°C for 10 to 15 days. On removing the cards to room temperature, the parasitoids complete their development and emerge normally.

Dosage

Release a minimum of 40,000 *Trichogramma* (i.e., two "Tricho Cards") per acre. Repeat the releases every 10 or 15 days throughout the season. More parasitoids may be released depending upon the crop and pest density.